Federal Highway Administration Operations Council

Road Weather Management & Operations Task Force

presents

A Web Conference on the

Maintenance Decision Support System

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U.S. Department of Transportation
Federal Highway Administration

The Winter Road Maintenance Decision Support System (MDSS) Project

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Road Weather Management Program

FHWA Operations Council

MDSS Web Conference

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U.S. Department of Transportation
Federal Highway Administration

Road Weather Management

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Road Weather Management

Road Weather Management Team

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U.S. Department of Transportation
Federal Highway Administration

Road Weather Management

Our Goal

***Anytime Anywhere Road Weather Information* for all Road Users**

The Outcome: Safe and Efficient Transportation Regardless of the Weather

The Premise Behind the Maintenance Decision Support System (MDSS)

MDSS is a bridge between these two communities

Winter Road Maintenance Community

- Plow Operators
- Garage Supervisors
- District Administrators

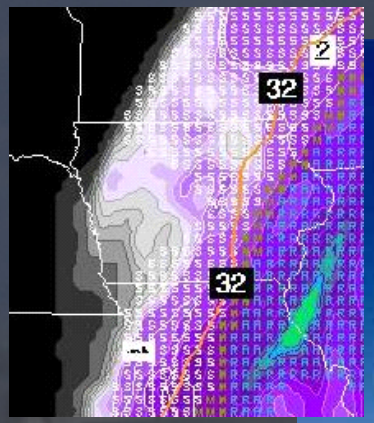
Communication & Requirements Divide

Meteorological Community

- Service Providers
- Researchers
- General Forecasters

What is the Maintenance Decision Support System (MDSS)?

MDSS
Live Demonstration



The prototype MDSS combines:

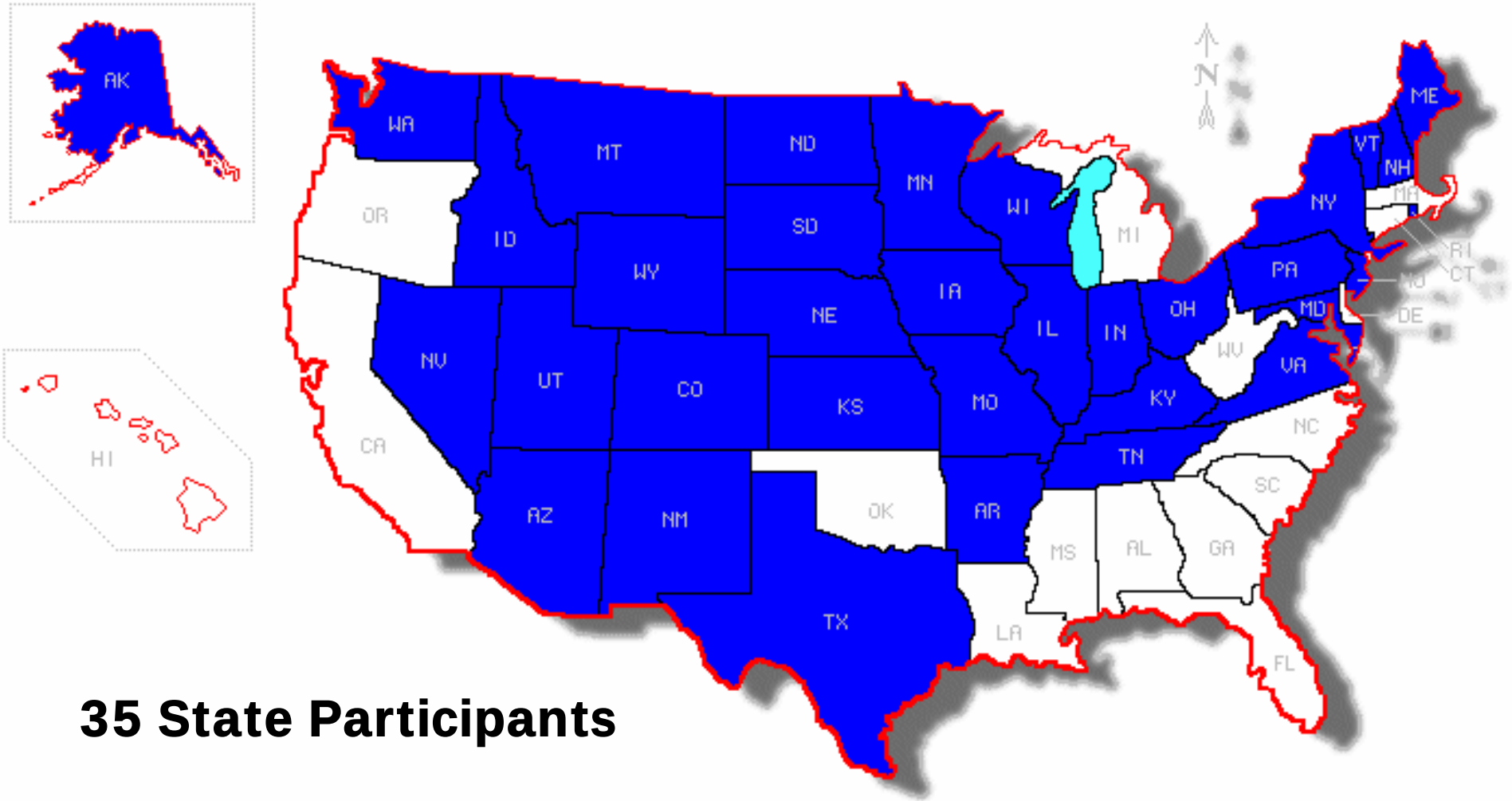
- **Advanced weather prediction**
- **Advanced road condition prediction**
- **Rules of practice for anti- and de-icing**

Generates treatment recommendations on a route-by-route basis on an easy to use display

Why is the MDSS project important to you?

- **Bridges the gap between meteorology & winter maintenance practices**
- **Customizable for each garage or route**
- **Provides both route-specific forecasts and treatment recommendations**
- **Modular technology & freely available**
- **Development guided by stakeholder group of maintenance personnel**

2000-2004 State DOT * MDSS Stakeholders



35 State Participants

*** Includes the District of Columbia**

Major Contributors to the MDSS Project

- National Center for Atmospheric Research
- MIT Lincoln Laboratory
- COE Cold Regions Research & Engineering Lab
- NOAA Forecast Systems Laboratory
- NOAA National Severe Storms Laboratory
- ISU Center for Transportation Research & Education
- Field Demonstration Host: Iowa DOT
- Technical Support: Mitretek Systems

Overview – MDSS Project Schedule

FY2000: Requirements Analysis

FY2001: Conceptual Prototype Development

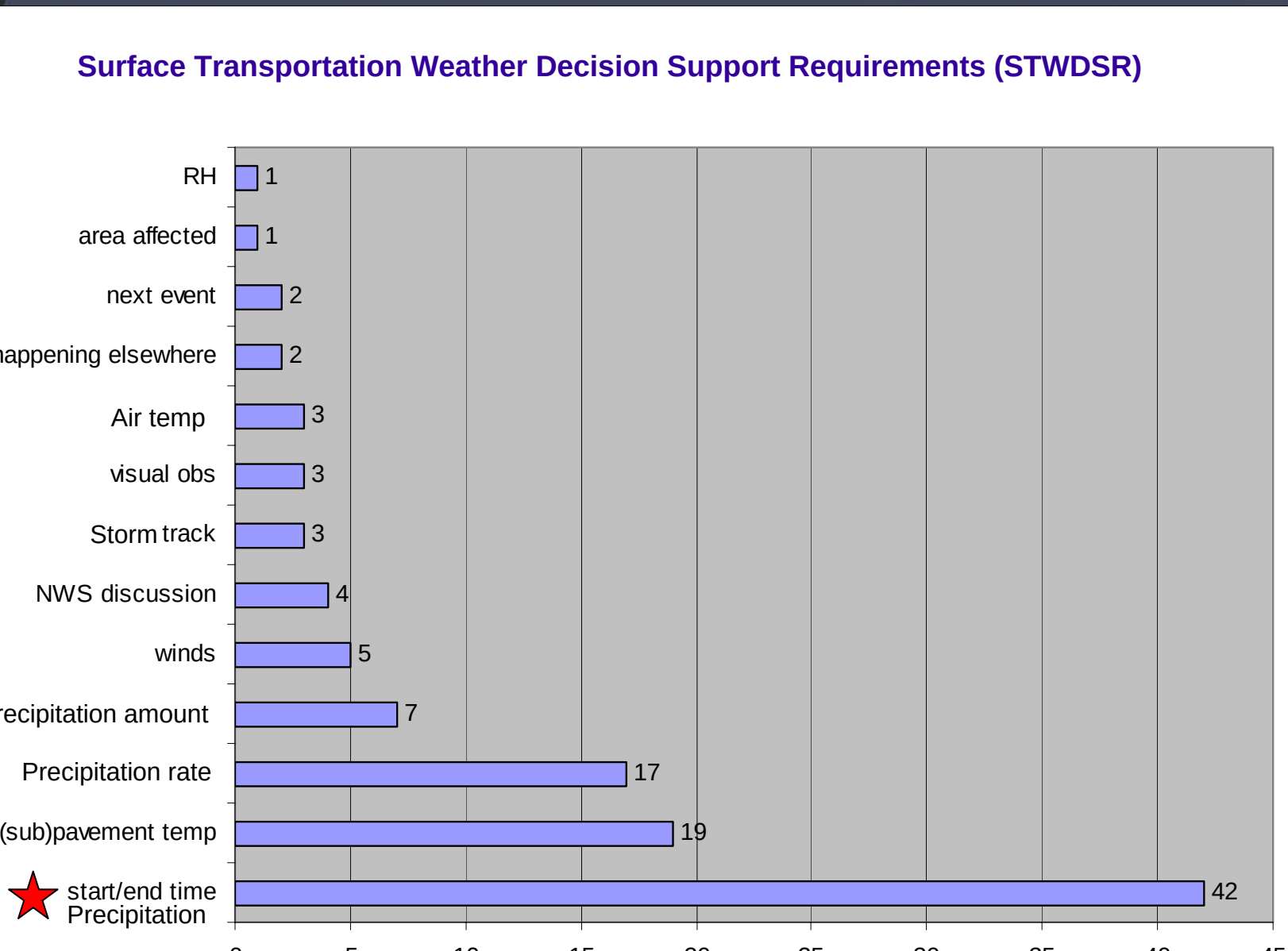
FY2002: MDSS Development, Technology Release-1

FY2003: Field Demonstration 1, Technology Release-2

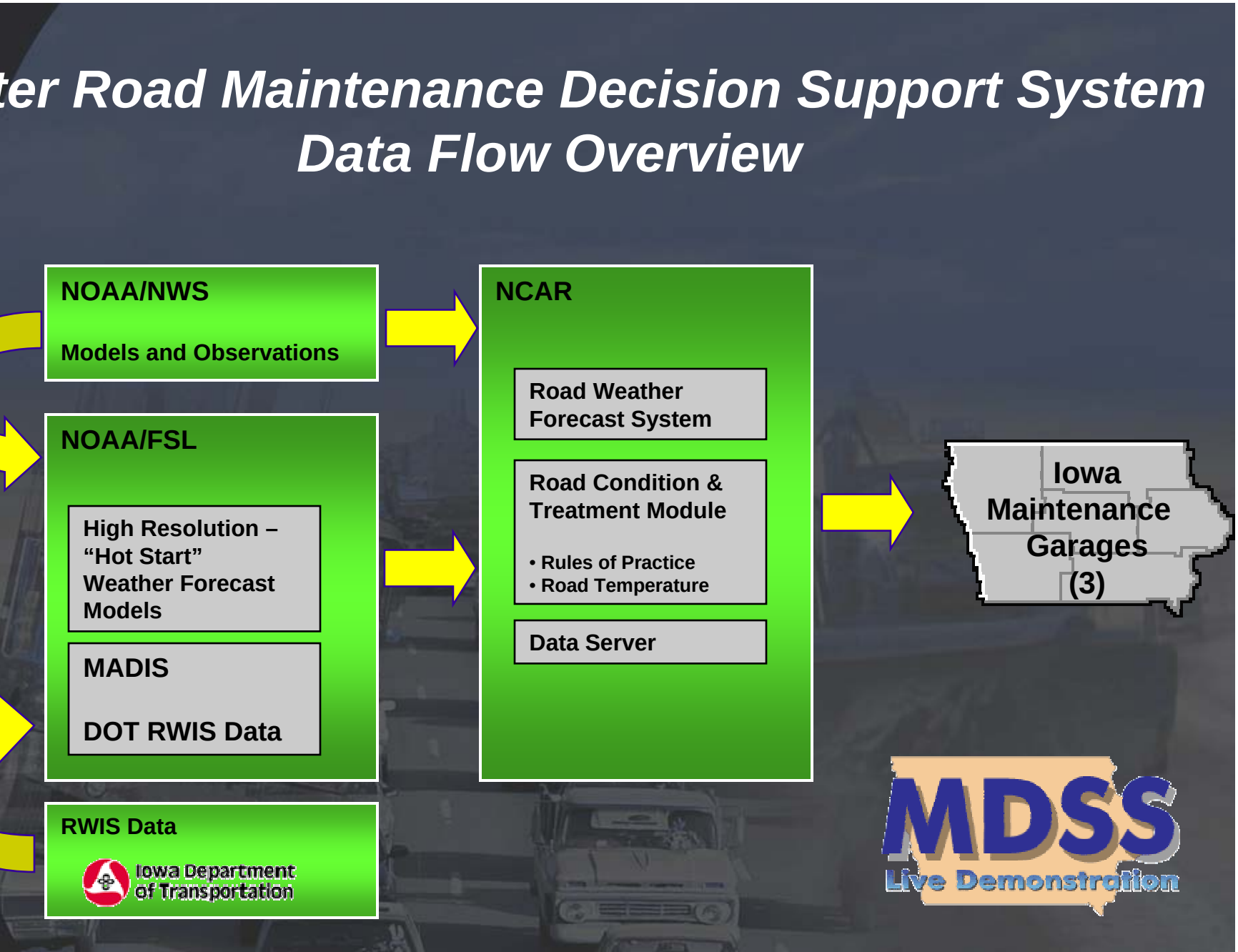
FY2004: Field Demonstration 2, Technology Release-3

FY 2005: Technology Transfer, R&D Tracks, Colorado Test Bed, Technology Release-3.x

DSS Requirements: Most Important Forecast Elements



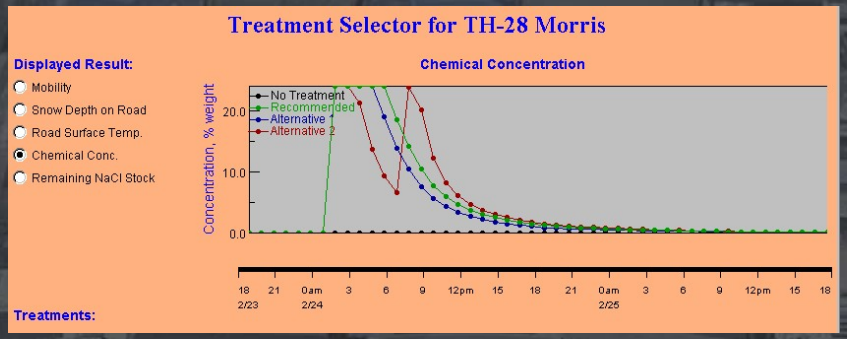
ter Road Maintenance Decision Support System
Data Flow Overview

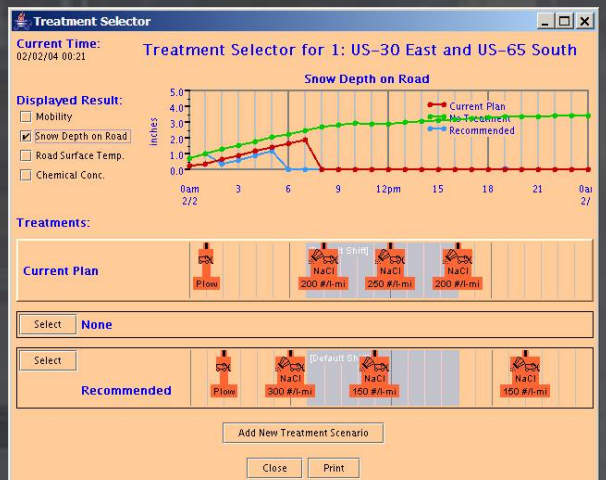


Decision Support

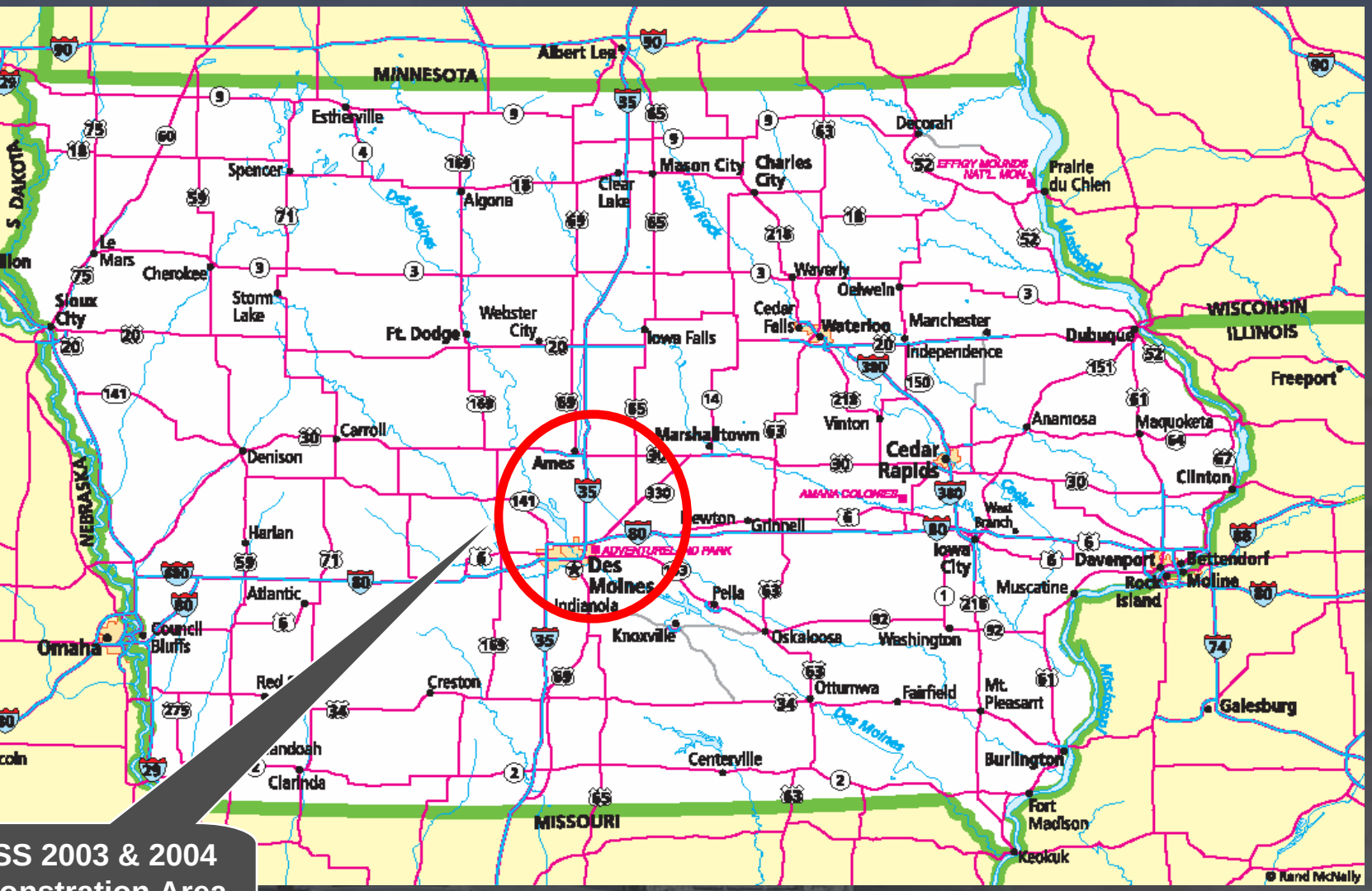
Winter Maintenance Decisions Supported by the MDSS Functional Prototype:

- Treatment Type (chemical, plow, sand, etc.)
- Treatment Amount (lbs per lane mile, etc.)
- Treatment Location (plow routes)
- Treatment Timing (start/end)





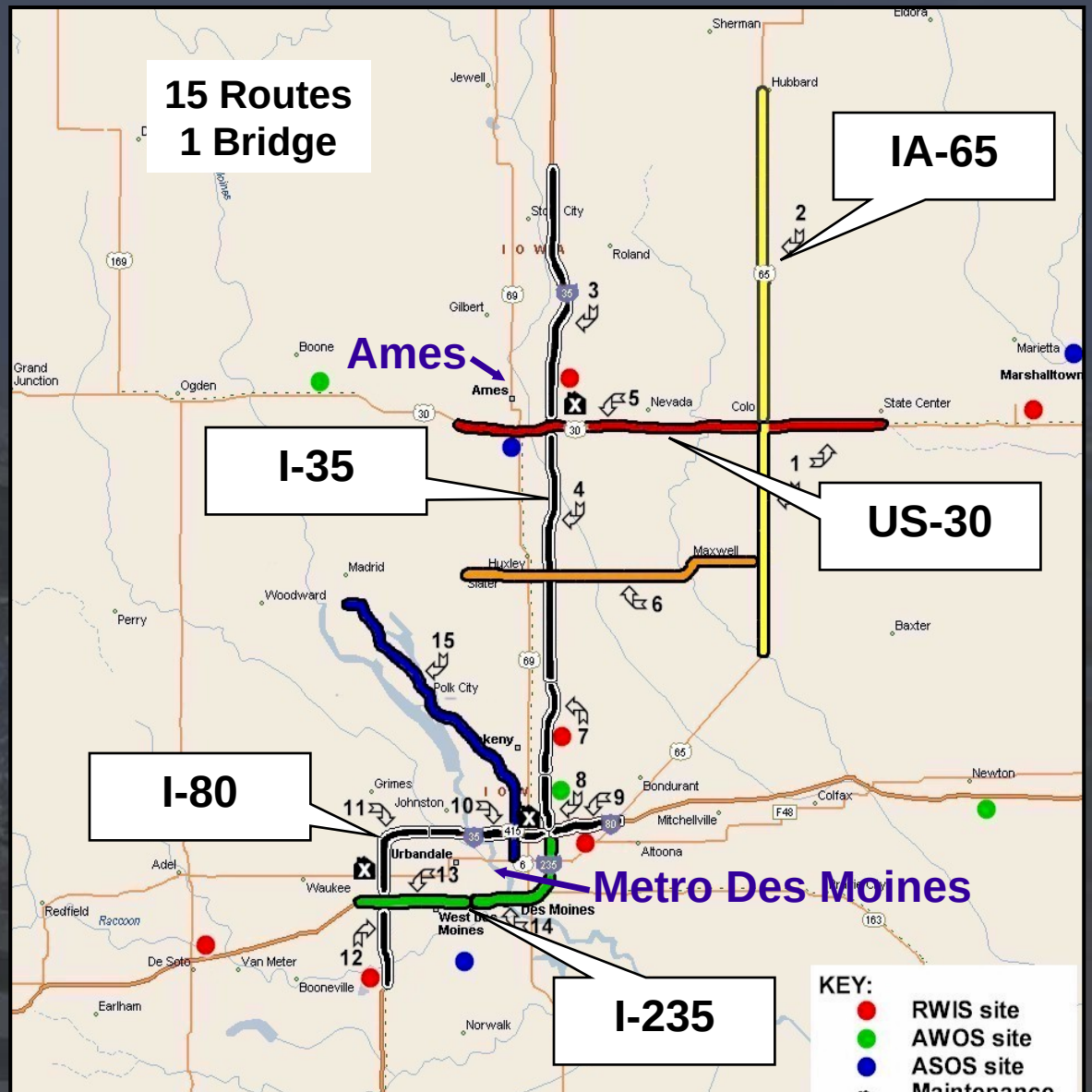
MDSS Field Demonstration Domain: Winters 2003 & 2004



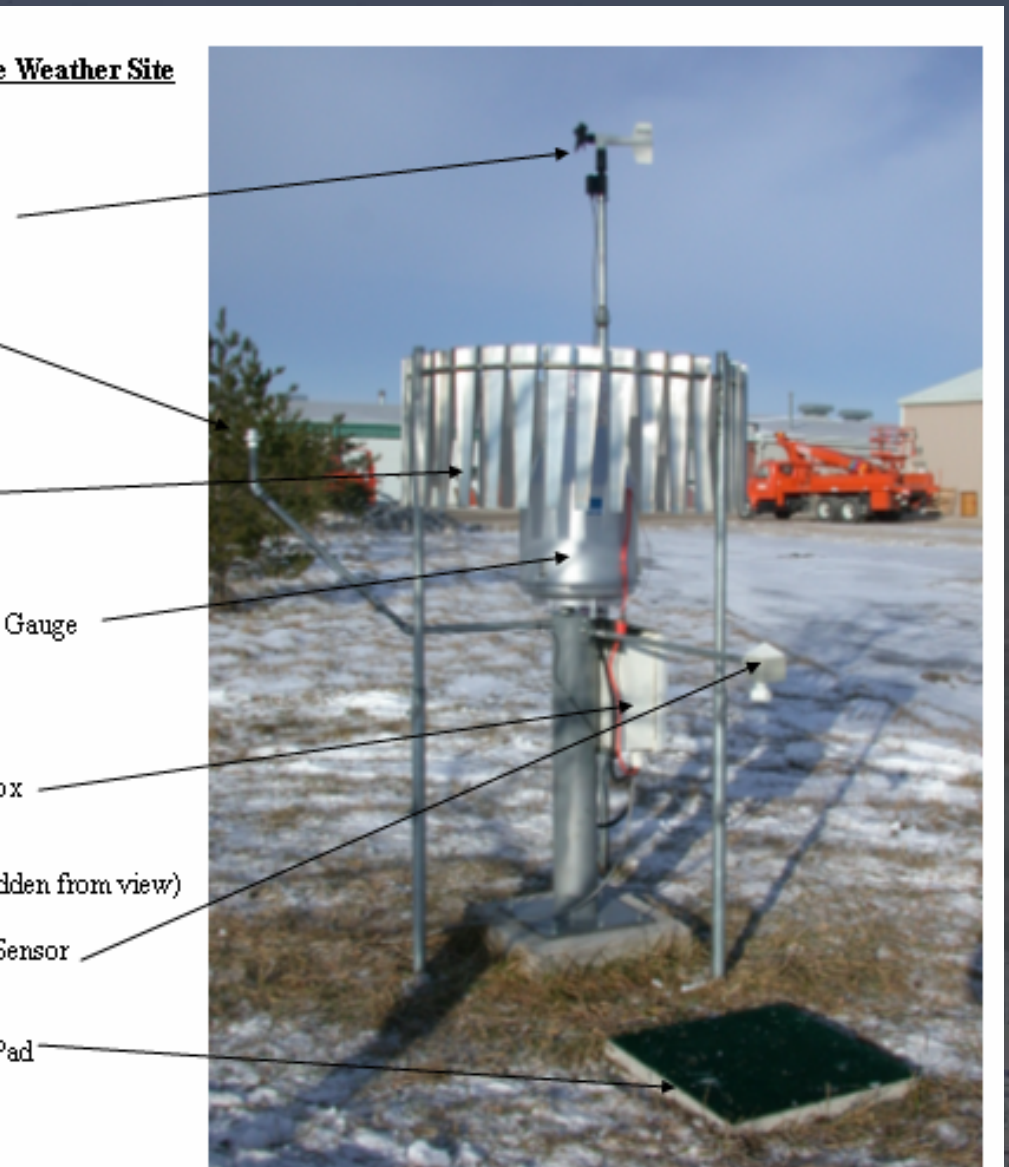
SS 2003 & 2004
onstration Area

were welcomed in high style & appreciated Iowa hospitality...

DSS Field Demonstration: Evaluation Routes



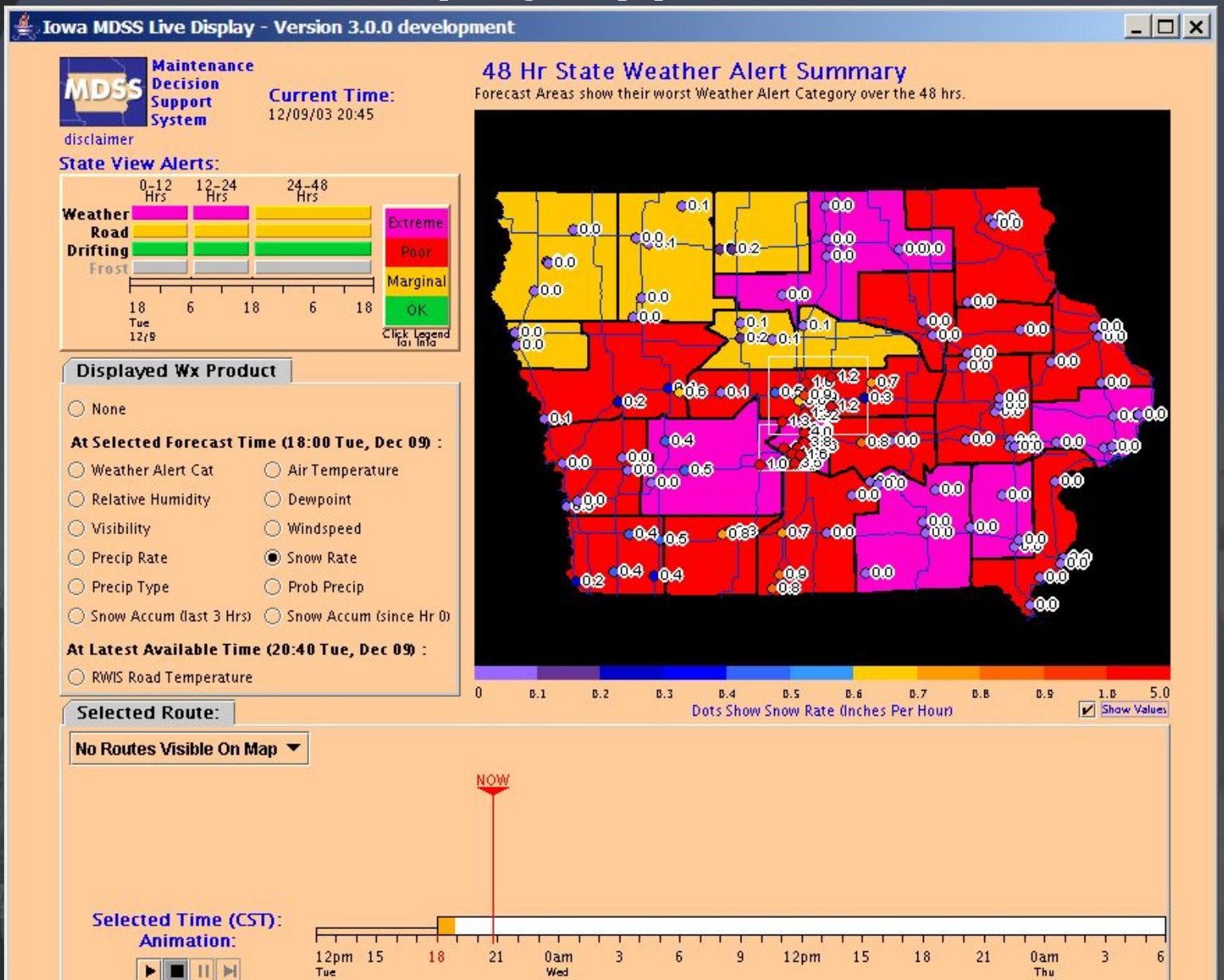
Verification for 2004 Demonstration



- **Concentrate Resources 3 routes**
- **Outfit 8 Iowa DOT plows with GPS/AVL**
- **Lab representatives on site**
- **Labs brought sensors to collect chemical concentrations & road temperatures to compare with RWIS & algorithms**
- **New sensors installed in Ames to supplement observations**

~~FORMS~~

MDSS Display Application Tour



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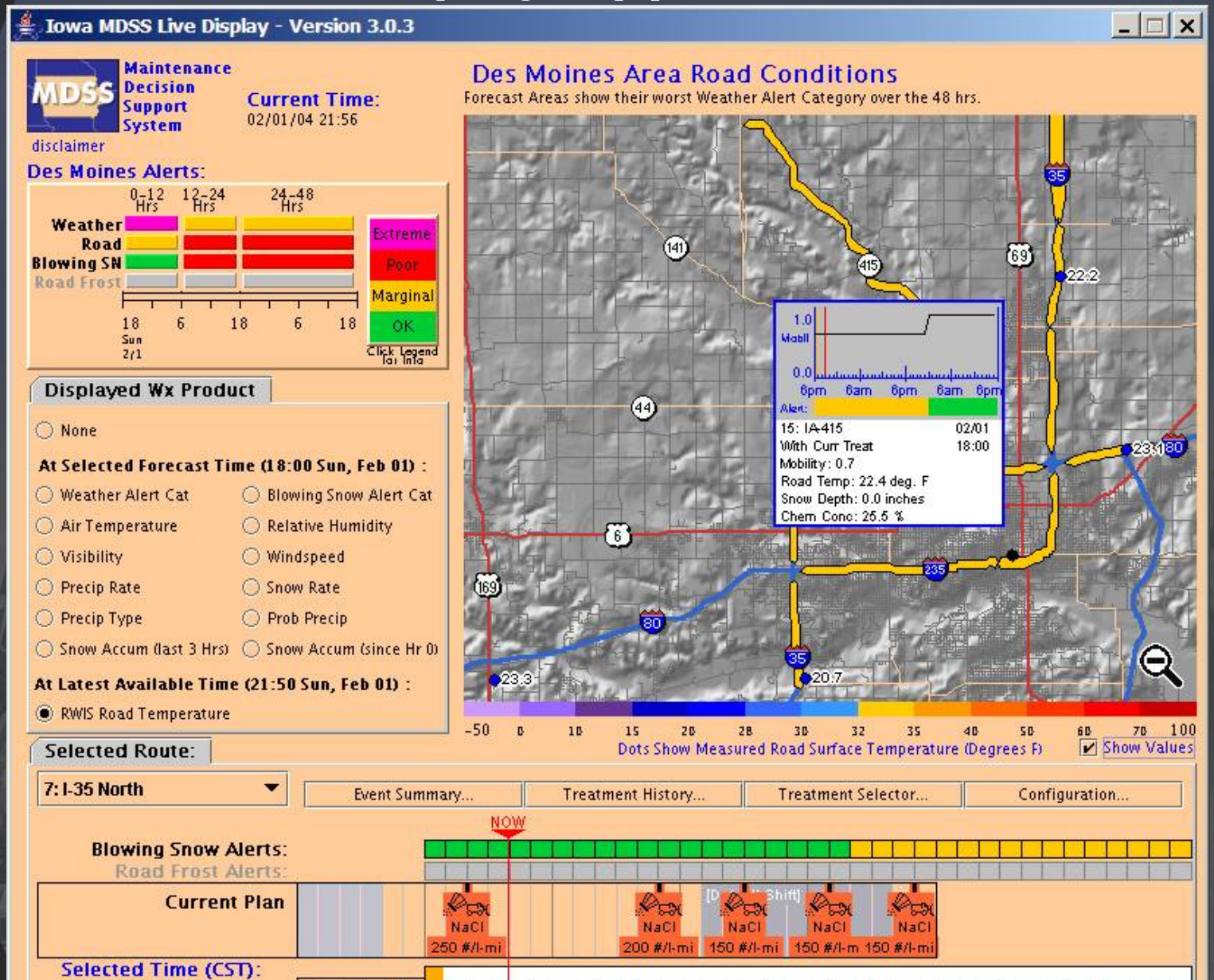

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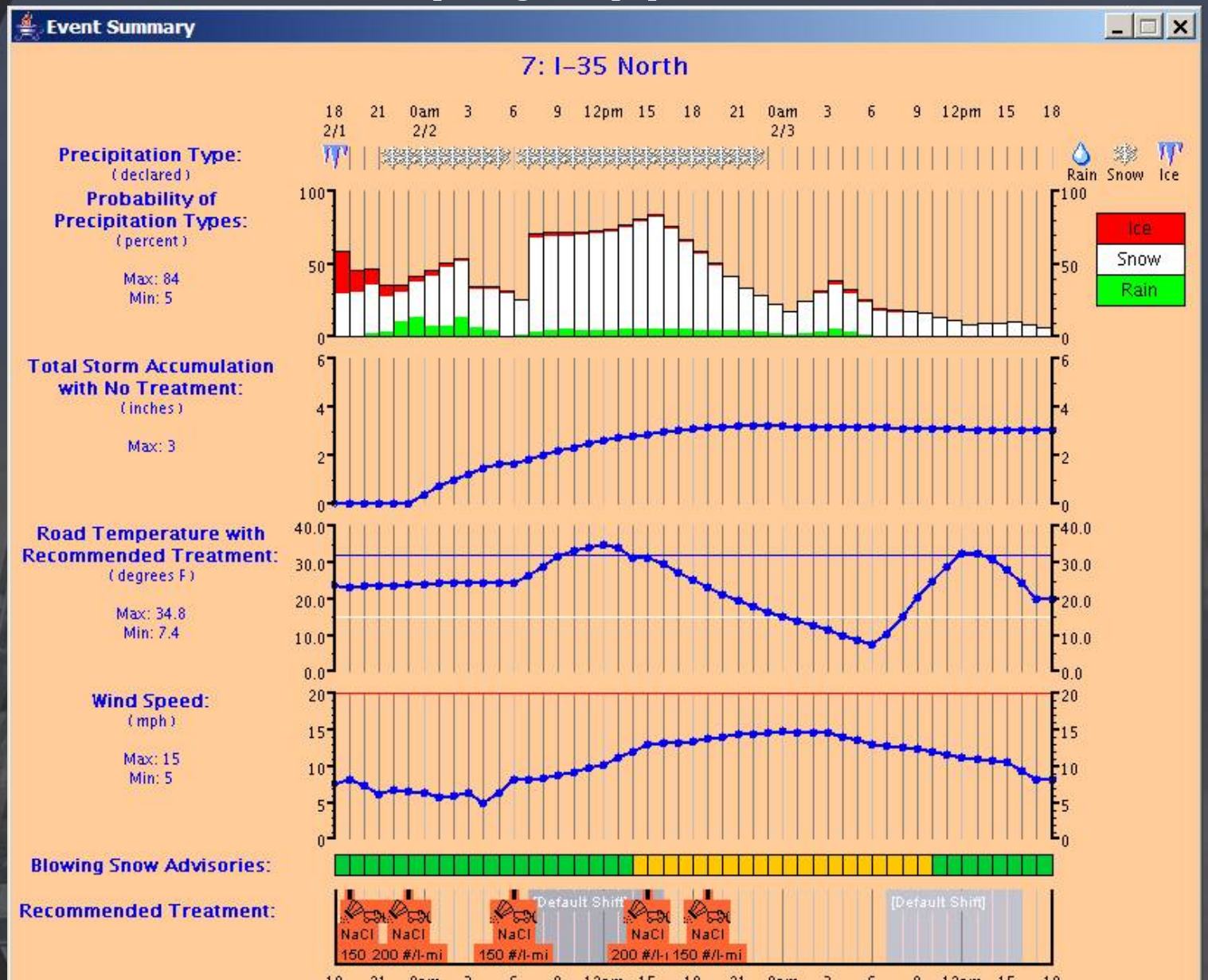

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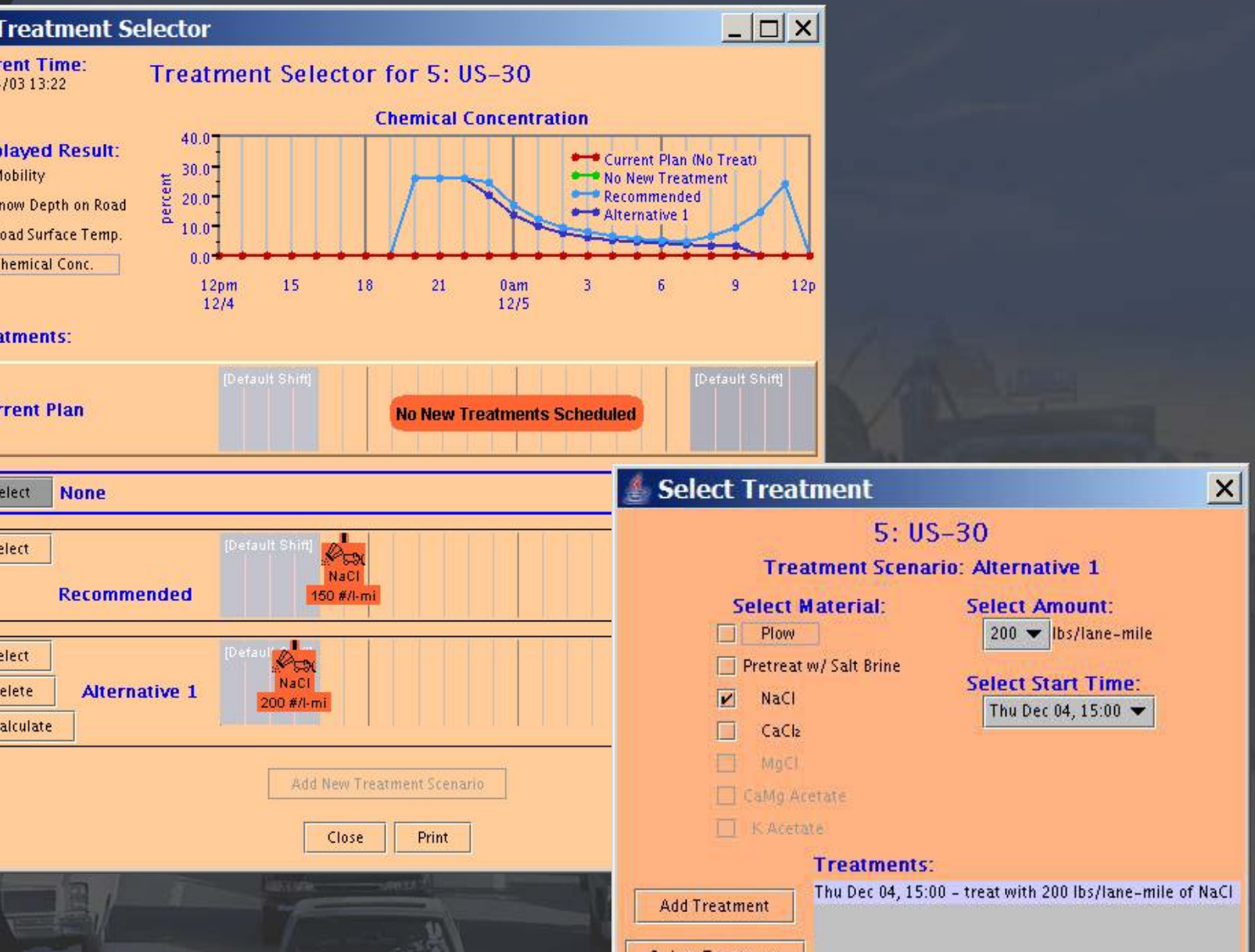
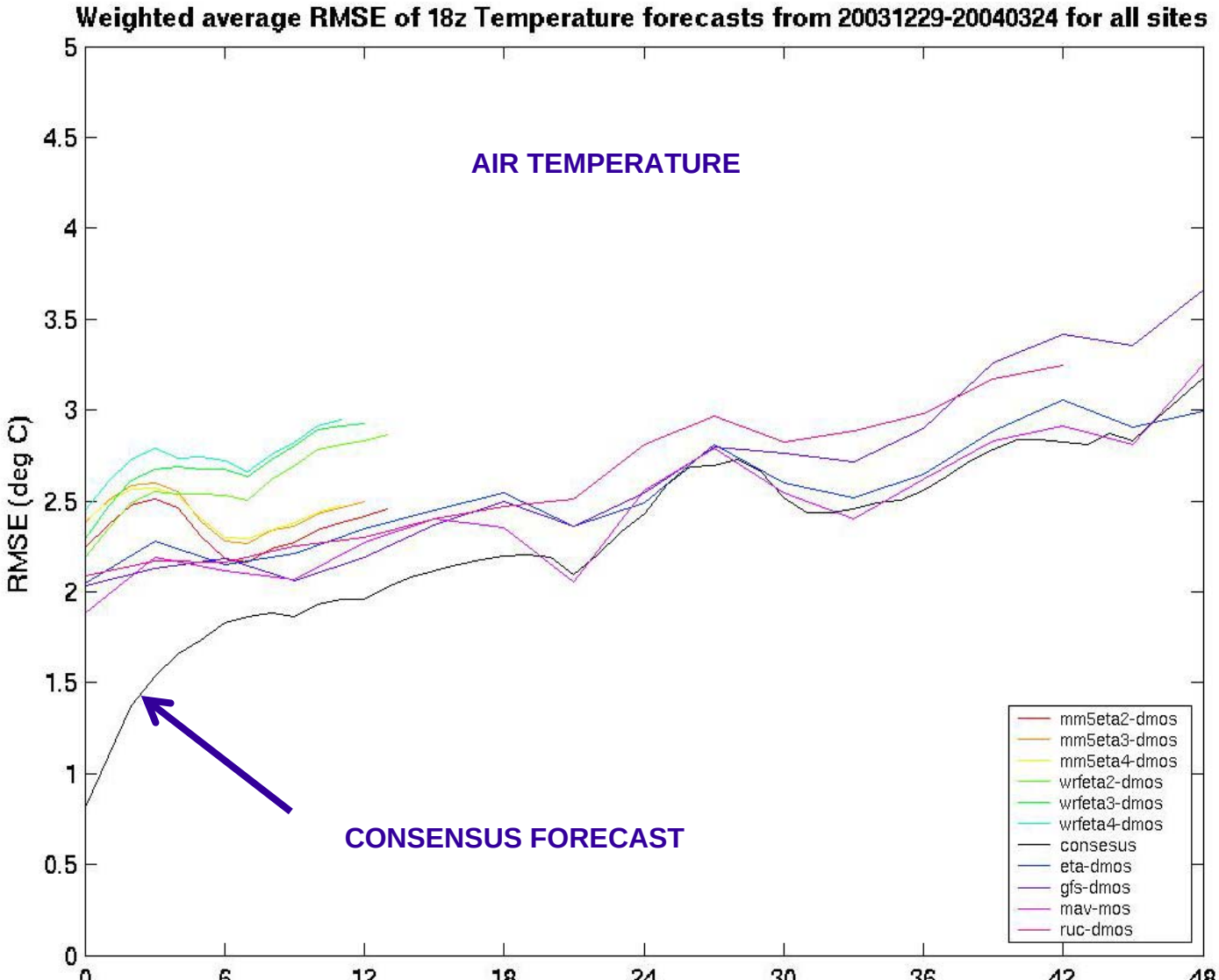


RWFS Data Fusion System Improves Forecasts

29 December 2003 – 24 March 2004



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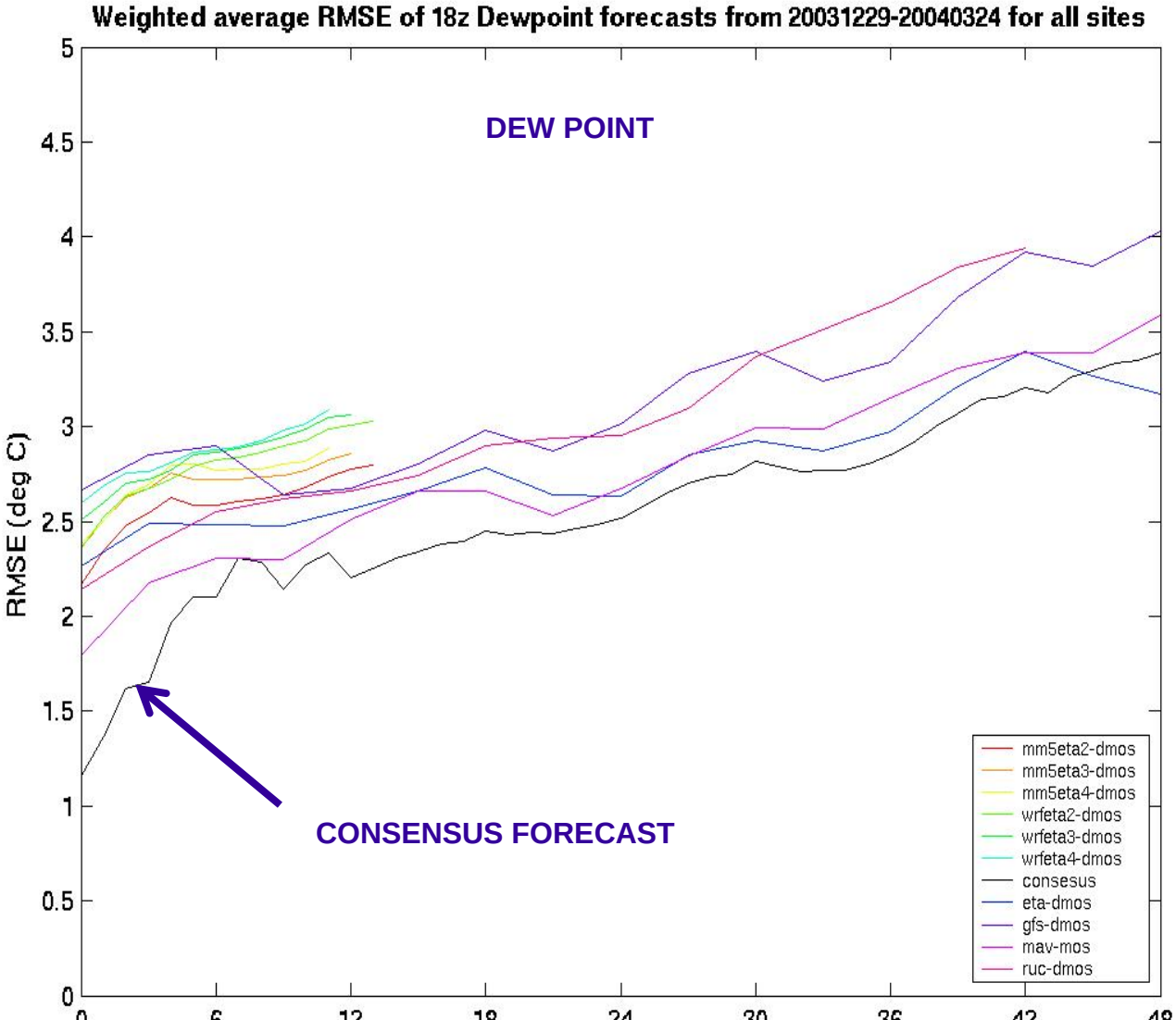

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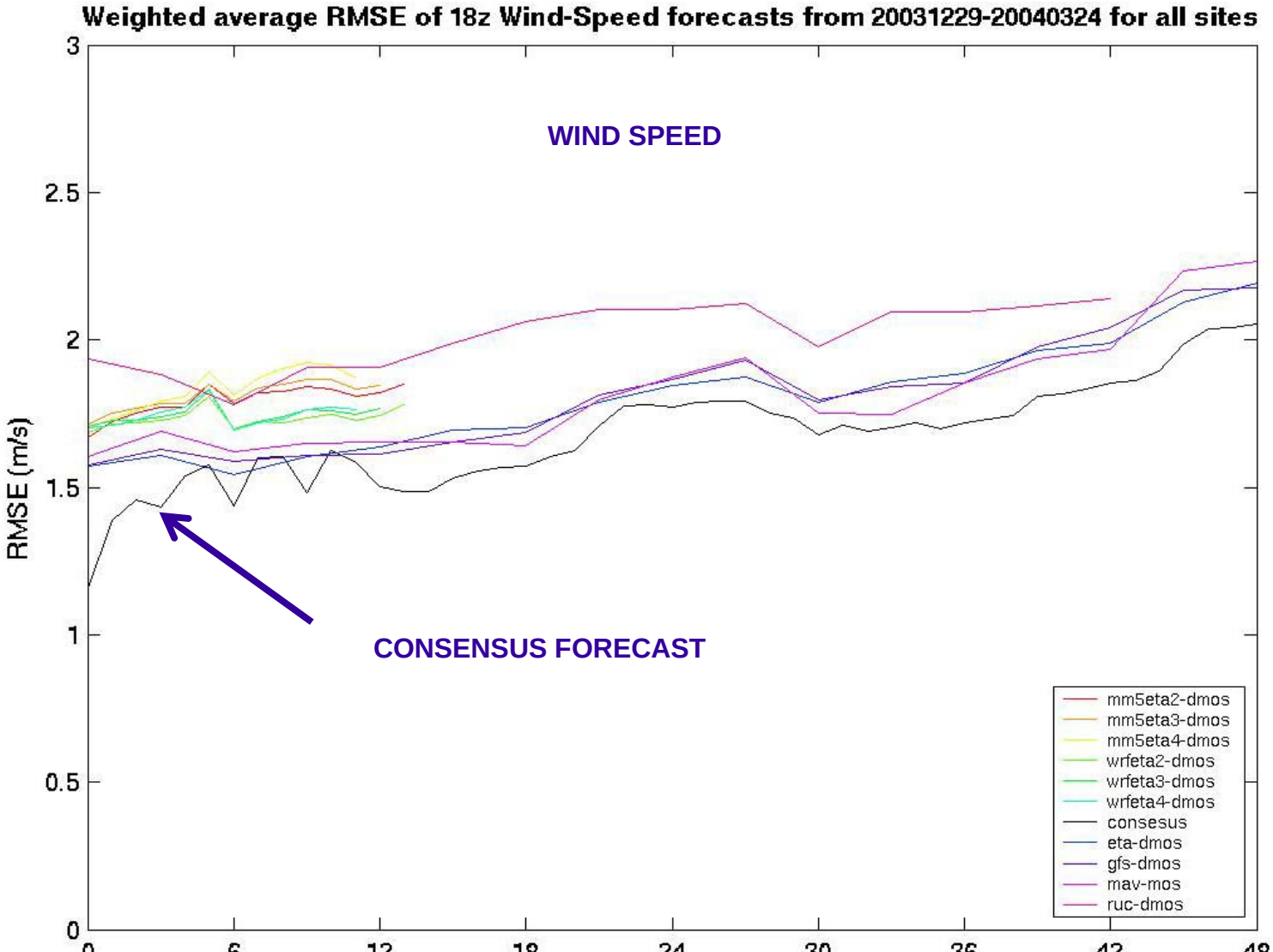
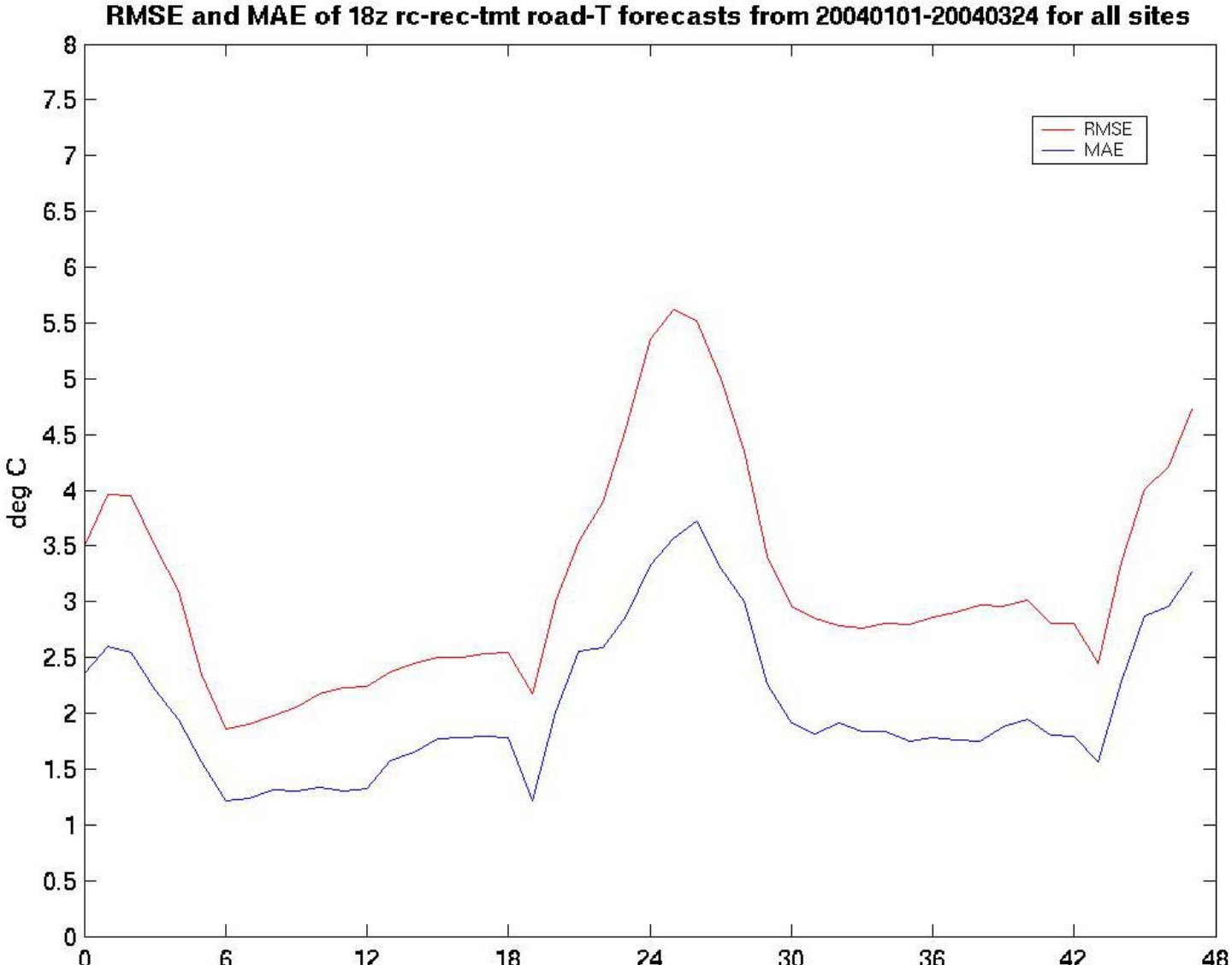


The Road Temperature Prediction Challenge

1 January 2004 – 24 March 2004



MDSS Demo II: General Findings

) Road operating agencies worldwide are very anxious to obtain better information and utilize weather information more effectively.

) DOTs are often working in a vacuum since there is little meteorological expertise in-house.

) The MDSS project and related activities have been successful at raising the awareness of the need for better road weather services.

MDSS Demo II: General Findings

) **The MDSS is a complex system and will require strong meteorological expertise and software and civil engineering skills to implement and maintain.**

The prototype is not a plug-and-play capability, so its roll-out by the private sector will take some time. Its capabilities will have to evolve as ITS and other technologies become available.

MDSS Demo II Challenges

Does not provide blowing snow
reatment recommendations.

24-48 hour forecasts for precipitation
ype and rate are still inaccurate in
many cases. 0-12 hr forecasts are
much better.

Does not provide road frost treatment
recommendations.

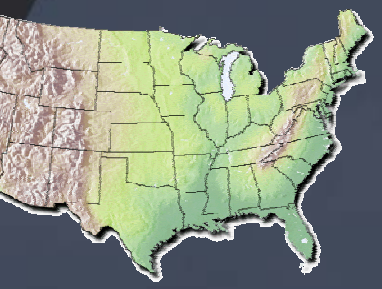
Does not handle staff optimization
shifts) scenarios.

Iowa DOT Testimonials

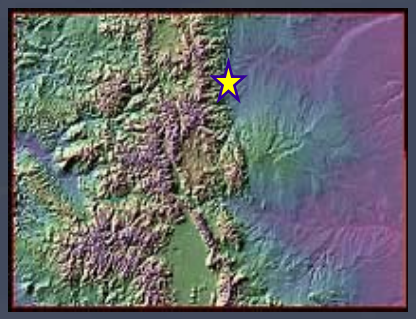
Iowa DOT Demo Participants

“Commercial entities should combine their best technologies with those demonstrated in the MDSS to improve the overall services provided to the DOTs.”

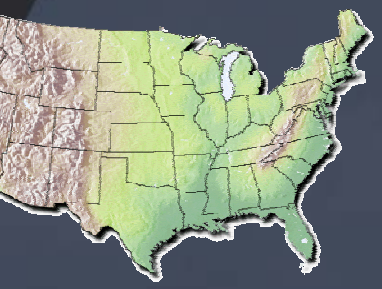
“Significant progress was seen between last year and this year. The staff very much likes the MDSS and it is viewed by staff as becoming very credible. The staff sees great potential for the MDSS technology.”



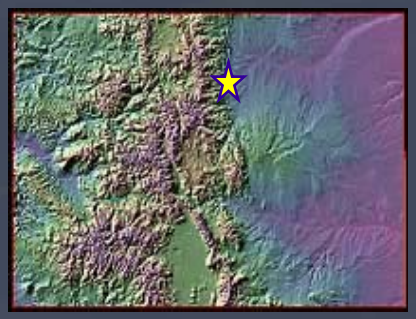
MDSS Plans



- **MDSS Stakeholder Meeting & T² Workshop Summer 04**
- **MDSS Software Release 3.0 NOW!**
- **Broad Support for Technology Transfer FY 05**
  - **Support State DOT Deployment Efforts**
    - **Draft Specifications**
    - **Support Technical Evaluations (e.g. Pooled Fund MDSS)**
  - **Provide Technical Support to Service Providers**
  - **Oversee Targeted Research**



MDSS Plans



Colorado Test Bed **Winter Season 2004-2005**

- **Continue overall refinements**
- **Expand Rules of Practice Module**
- **Develop Road Frost Potential Product**
- **Develop solutions in complex terrain**
- **Continue road weather outreach and education**

Contact & Resource Information

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FHWA Road Weather Web Site:
http://www.ops.fhwa.dot.gov/weather

MDSS Web Site (Including Release 3 CDs):
http://www.rap.ucar.edu/projects/rdwx_mdss

Clarus Resource Site:
http://www.clarusinitiative.org